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ABSTRACT

Prediction is made of a change in the role of the teacher from dispenser of knowledge to a learning facilitator and an "anticipatory design science" specialist. A description is given of a workshop seminar focusing on the process of designing educational futures so that teachers can gain direct experience with policy study and formation. This workshop, "Designing Educational Futures," was developed to involve the individual in a series of exercises in which their task is to identify problems, critique the problem situations, formulate questions around the problems, select a single question, and formulate a policy design out of their investigation into the problem. Included in this paper is the series of 11 worksheets used in the described seminar. (JD)

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DESIGNING EDUCATIONAL FUTURES:

An Application of Comparative
Futurology to Education

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Introduction

The professional preparation of teachers usually calls for at least one course in the social foundations of education to introduce the prospective teacher to the history and philosophy of the profession and the use of conventional academic skills in studying educational problems.

Surveys of education graduates indicate that the courses taken in college which had the lowest application to their current teaching responsibilities were usually those courses which were not directly related to teaching, and that often included the social foundations course.¹

Several reasons can be offered to justify the low evaluation of social foundations courses, but rather than try to offer a rationale or some statistically analytic reasons for the survey results, I attempted to improve the situation. My aim was to meet both the professional development goals of a social foundations course and the needs identified by education graduates who had teaching and/or educational administrative positions.

The role of the teacher as the authority who transmits knowledge to students has been challenged by many authors.² It is clear that the days of the teacher as dispenser of information are very limited, if not already vanishing, to the hum and click of computerized information retrieval systems. It is also evident that most individuals cannot compete with the speed and volume of computers for storing and dispensing information. As the computer hardware costs drop lower than the cost of

movie projectors, the public schools will begin signing on with various data processing and information retrieval services and provide terminals in almost every classroom, or at least set up special computer terminal centers in libraries where groups of students could be served.

Does this scenario forecast the replacement of the teacher with a telecommunication system?³ Not at all, for the teacher's role will be substantially changed from a transmitter of knowledge to a learning facilitator and an "anticipatory design science" specialist.⁴ The concept of "anticipatory design science" was introduced by Buckminster Fuller. All I have done is to broaden the scope to include teachers as members of the "anticipatory design science" team.

Role of the Teacher in Future Tense

What I have constructed is a workshop seminar that focuses on the process of designing educational futures so that teachers, or prospective teachers, could gain direct experience with policy study and formulation. In addition to making contributions to their profession, they could assist their own students in the acquisition of skills necessary to continue with both the study of "anticipatory design science" and the advance of human knowledge and per capita wealth.

Buckminster Fuller offered an interesting equation of wealth equal to energy plus knowledge.⁵ Since energy cannot be created or destroyed (Law of Conservation of Energy) then wealth is directly proportional to advances in human knowledge. Knowledge cannot decrease unless there is a total worldwide cataclysm which destroys both minds and libraries; therefore, wealth can only increase in proportion to the effort put

forward to increase knowledge. Thus, education becomes the single most important industry for the production of wealth. Rather than consider education a social cost and carry it on the books as an "expense", which should be balanced by income, it should be carried as a social investment in human resources, and a capital investment in wealth.

The concept of the teacher as an anticipatory design science specialist can be considered in terms of the social need to expand knowledge, develop human resources, and further community development. The industrial, or post-industrial, country has already committed itself to a need for knowledge since the level of social organization and economic interdependency has moved from individual to group and organizational problem solving. The only way to further expand knowledge is to expand the social and private allocation to research and experience with problem solving. Clearly, knowledge cannot increase without the public recognition that it must be increased, and a public commitment to provide the economic means to support the increase. For example, research and development is often recognized within the large corporation as vital to its future viability. The essence of that viability being the corporate ability to make a profit. The justification for corporate R & D expense is made on the basis of investment which the corporation needs to improve products and/or services, and create new ones. The criteria for the future viability of the general public in the sense of the social collective lies in its utilization of human resources for problem solving. The public sector, likewise, needs to justify its R & D expense on the basis of investment in developing human resources for more effective problem solving skills.

Often the language we think in, limits what we can think about. The words research and experience with problem solving set parameters for the reader in terms of their own definition of "research" and "experience with problem solving." I would accept "experience with problem solving" as contributing to knowledge in both a personal and social sense. "Research" is generally accepted by the scientific community as the sine qua non of knowledge production as long as acceptable scientific method is used in the research. The distinction between these two concepts is important for understanding the value of designing educational futures and its relationship to public education.

To advance the frontiers of specialized knowledge research is essential, but to advance knowledge in the individual sense does not mean creating new knowledge for a particular academic discipline, although this could be the case in some situations, but rather to create new knowledge for the individual. This new knowledge for the individual may be embodied in both information and process; thus designing futures involves the individual in both the problem solving and policy formulation process. The individual can be indoctrinated in what information others have discovered, but the joy of discovery, the excitement of finding evidence or new leads, and the stimulation of problem solving research are all vital to the continuation of learning and discovery for the individual.

Designing Educational Futures: A Process and a Design

The purpose of the Designing Educational Futures is to involve the individual in a series of exercises in which their task is to identify

problems, critique the problem situations, formulate questions around the problems, select a single question and formulate a policy design out of their investigation into the problem. The latter requires investigation into various ways that may have been proposed and the development of possible ways that might solve a problem. The last stage in policy formulation involves comparative futurology.

Possible futures are analyzed, compared and then a polarized points of view comparison is examined for alternative futures. This comparative futurology approach gives the policy formulator an opportunity to examine and comprehend points of view that are often in opposition because of value differences and value interpretations of basic concepts. The policy formulator can then construct policy designs that address specific problems with alternatives based on analysis and research.

The format for Designing Educational Futures is a series of eleven worksheets that begin with an exercise of graphic ontology. Worksheet One (See Fig. 1) asks for a representation of past, present and future and gives the participant an opportunity to visually represent their concept of existence in relation to time. In addition, the participant is asked to associate a color with past, present and future. This encourages the individual to practice associative axiology.⁶ Participants develop their designs and share them for the first time in a workshop session. This gives participants an opportunity to discuss their own representations and to see and hear how, and why, others have developed their graphic designs.

Figure 1

DESIGNING EDUCATIONAL FUTURES

Worksheet 1

Graphic Ontology

The past, present and future are concepts which may or may not be related, but we all have perceptions of the significance of past, present and future and their inter-relatedness.

Using the space below or a separate sheet, represent PAST, PRESENT, and FUTURE by three circles.

There are no restrictions on the placing of the circles or their size, but if possible use separate colors for Past, Present, and Future. (Choose a color you think represents Past, Present, and Future.)

The first session is very important as it introduces the participant to the process of being involved in doing future research and being exposed to polarized points of view, comparative futurology, and values clarification. All this from one exercise in graphic ontology. Worksheet One and the first workshop session is also used as a demonstration of synergy—doing more with less. This concept is a goal in policy formulation, but participants have to experience the concept of synergy before they can be encouraged to strive for inclusion of the strategy in a policy recommendation.

Worksheet Two (See Fig. 2) asks the participant to identify problems or issues and then formulate a question about that problem or issue. Worksheet Three (See Fig. 3) critiques the questions concerning problems or issues around the criteria of symptom or cause. This process opens question formulation to analysis and assists the participant with the process of rewriting questions around causal factors rather than symptom.

Also the participant is asked to critique the questions and rewrite them in a divergent form which would call for multiple answers rather than a single answer. This is important for designing educational futures because the formulation of policy requires a holistic view which takes in opposing views on interpretation of issues as well as solutions to problems.

Figure 2

DESIGNING EDUCATIONAL FUTURES

Worksheet 2

Formulating Questions

Issues and problems influence our everyday lives and can quickly turn us into optimist or pessimist depending on our success rate at dealing with the resolution of conflict. Questioning has a similar experiential learning mode that can turn us off to learning or lead us on the self actualized learning.

What issues or problems are you faced with, or will you be faced with? Using both present and future tense perspective, write down four or five problems or issues you would like to investigate, better understand and/or solve.

Problems or Issues that you are faced with NOW:

- I. 1.
- 2.
- 3.
- 4.
- 5.

Problems or Issues that you will probably be faced with in the FUTURE:

- II. 1.
- 2.
- 3.
- 4.
- 5.

Circle any items that appear on both lists. These may be prime candidates.

Take each item in Group I and write the item in a question form.

Group I items in question form:

- 1.
- 2.
- 3.
- 4.
- 5.

Do the same for Group II items:

Group II items in question form:

- 1.
- 2.
- 3.
- 4.
- 5.

For each question, ask yourself, "What other ways might the question be formulated?" For each question, write down the different ways you can think of to phrase the question. You might experiment using the six serving masters of what, why, when, where, how and who.

Revision of Group I Questions:

- 1.
- 2.
- 3.
- 4.
- 5.

Revision of Group II Questions:

- 1.
- 2.
- 3.
- 4.
- 5.

Figure 3

DESIGNING EDUCATIONAL FUTURES

Question Critiquing

Worksheet 3

What makes the difference between a challenging question and one that is not? Some questions cut to the heart of the issue or problem; whereas, others seem to deal with facets (edges) of a problem or issue. Perhaps it is the difference between dealing with symptoms of a problem or issue rather than dealing with cause. The symptoms of a problem or issue are often the evidence we use to identify a problem or issue, but may not be the cause. For example, a group of students are doing poorly in ninth grade World History and almost constantly seem to keep the class in a turmoil. The teacher may identify the problem as discipline and work on measures to control student behavior; whereas, discipline is a symptom and the cause might be required curriculum and heterogeneous grouping, or lack of alternatives.

What is needed is critical analysis of the questions in Group I & II on Worksheet 2.

Select questions from Group I and indicate possible CAUSES for each problem or issue.

Group I Questions - Symptom/Causes Critiquing

Directions: Identify the key issue or problem in the question then list possible causes for each problem or issue within the question.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

Group II Questions - Symptom/Causes Critiquing

Directions: Identify the key issue or problem in the question then list possible causes for each problem or issue within the question.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

Improving Questions by Divergent Transformation

Questions that can be answered with one answer may not be helpful to policy design because they limit the possibilities or implementation as well as the breadth of understanding of the question researcher. For example, a question like "How can I improve the reading ability of my slow readers in third grade?" could be answered with one strategy - i.e. adopt a language arts approach in

Participants undertake Worksheet Four (See Fig. 4) after listening to a recorded talk given by Neil Postman entitled, "Telling It Like It Ain't."⁷ Professor Postman gives examples of strategies that enable a person to examine problem statements from a concept useage point of view.

The challenge to the participants in the workshop is to critique their own questions and discuss concepts which may represent old or new words in the educationallexicon and the problem-answer strategy⁸ suggested by Professor Postman that could be utilized in some problem situations. The linguistic analysis that Professor Postman suggests is not meant to solve problems or answer questions. The strategies do, however, provide a process for critiquing questions and help the participants formulate better questions by providing more insight into the multi-faceted dimension of problems or issues.

After smali group discussion and total workshop discussion depending on the size,⁹ the participants are then asked to select a problem or issue that will become the focus of their educational policy design. If the selection of a single question presents a problem, the use of

Worksheet Five (See Fig. 5) is utilized to help prioritize a group of questions and select one for indepth study and a policy design.

Figure 4

DESIGNING EDUCATIONAL FUTURES

Linguistic Analysis: Addition, Subtraction and Problem-Answer

Worksheet 4

This Worksheet should be done AFTER listening to the Postman tape in class, or on Reserve in Kresge Library and Performing Arts Library in 217 Varner Hall.

Write the Revised questions from the second page of Worksheet 3 in the space provided below and perform the following linguistic strategies:

- I. Subtraction - examine the questions for educational concept words that might be questioned and possibly subtracted. Circle those concepts and identify with (S).
- II. Addition - examine the questions for educational concepts that might be recent additions to the educational lexicon. Circle those concepts and identify with (A).
- III. Problem/Answer - examine each question for the possibility of the problem being the answer. Circle the question number if the possibility exists and use the back for discussing each question where renaming the problem the answer might be a possibility, or use your LOG.

Group I Questions (Use Revised Questions from page 2 of Worksheet 3)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

Group II Questions (Use Revised Questions from page 2 of Worksheet 3)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

Figure 5

DESIGNING EDUCATIONAL FUTURES

Worksheet 5

Prioritizing Questions

The process of final selection of a Question may be difficult, but to assist the following "Prioritizing" process might prove beneficial.

Instructions: Using the chart on the back, compare each question to each other question. You may wish to work exclusively with Group I and II Questions from Worksheet 4, or you may insert questions from previous worksheets or even new questions.

1. Write the key concepts from each question in the vertical list of Questions and do the same for the horizontal list across the top.
2. In comparing question I to question II, be sure to indicate which question is more important to you--question I or II, and write the Roman numeral in the box. Then use the arabic number coefficients (1, 2, or 3) to indicate the degree of importance to you.

PRIORITIZING QUESTIONS

		Questions										TOTAL* COEFFICIENTS	Priority Ranking
Questions		I	II	III	IV	V	VI	VII	VIII	IX	X		
Coefficient Values	I												
	II												
	III												
	IV												
	V												
	VI												
	VII												
	VIII												
	IX												
	X												
1. - a little more im- portant													
2. - quite a bit more important													
3. - a lot more im- portant													

* When calculating Total Coefficient for each question, look through the whole matrix for Question I, etc., and ADD up the coefficients for all boxes in which Question I, etc. appears with a coefficient.

Worksheet Six (See Fig. 6) introduces the concept of the ideal future—what should be the answer to the question. The participant now has the opportunity to dream about the ideal situation and how the question selected for a policy design could be answered in a future tense where all the variables could conceivably be controlled.

The next stage in the design process involves the use of lateral thinking to increase ideation for developing alternative futures. Before participants start on Worksheet Seven, they listen to a tape entitled "How to Change Ideas" by Edward DeBono.¹⁰ The concept of lateral thinking suggested by Edward DeBono is useful for developing new ideas about a problem situation. Worksheet Seven (See Fig. 7) give participants an opportunity to practice the lateral thinking strategies on the concepts expressed in the question used for Worksheet Six.

Worksheet Eight (See Fig. 8) builds on the ideation process and asks the participants to create various scenarios out of the possible and probable ideas developed from using the lateral thinking process. At this stage, the ideas developed from Worksheet Seven are given substance in a tentative design scenario where other factors must also be taken into consideration. The process of working through some of the combination of ideas generated for Worksheet Seven gives the participants an opportunity to cull out impossible ideas and work with ideas that might have a possibility of being integrated into a future design.

Figure 6

DESIGNING EDUCATIONAL FUTURES

Worksheet 6 1st Draft - Educational Design In Future Tense

With no reference to research past or present, use this sheet to speculate on the answer to your question in the future tense. What should be the answer to your question? In your attempt to "futurize" your answer you should focus on your own perception of what should be the resolution of the problem or issue embodied in your question. This draft gives you an opportunity to deal with your question in the ideal--the future where you have complete authority to establish policy. It's your world; what will you design?

Choose the question that has the most priority for you, or that had the highest coefficient from W.S. 5.

Question:

Why is the Question meaningful to you? (Two or three paragraphs)

First Draft -- What "should be", the answer to your Question stated above?
(Use this and additional sheets and staple together. Or you can use your LOG).

Figure 7

DESIGNING EDUCATIONAL FUTURES

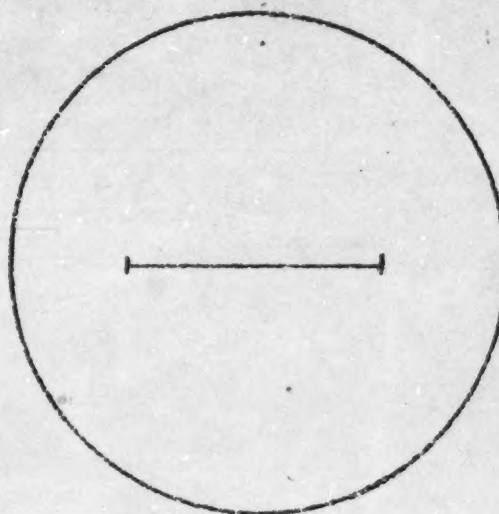
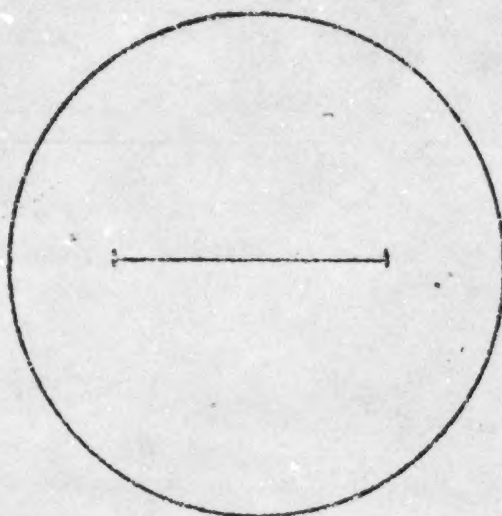
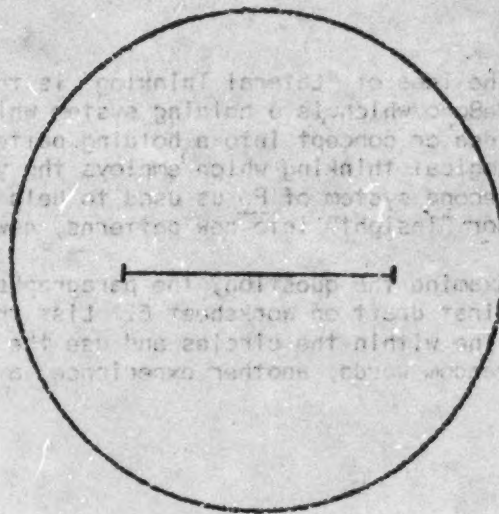
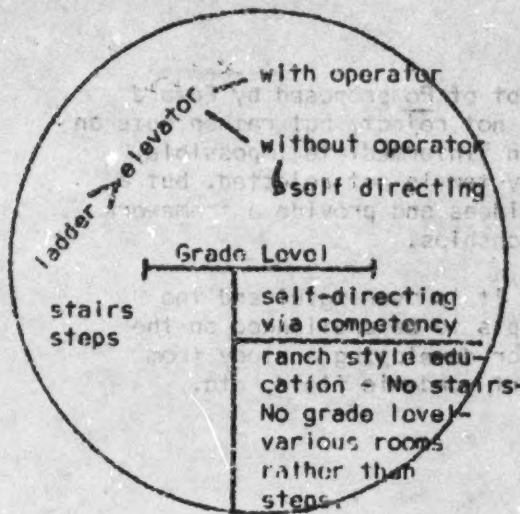
Worksheet 7

Lateral Thinking for Design Ideation

The idea of "Lateral Thinking" is the concept of Po proposed by Edward DeBono which is a holding system which does not reject, but rather puts an idea or concept into a holding pattern or an "intermediate impossible." Logical thinking which employs the yes-no system is not rejected, but a second system of Po is used to help change ideas and provide a framework for "insight" into new patterns, new relationships.

Examine the question, the paragraphs on why it is meaningful and the first draft on Worksheet 6. List the concepts to be challenged on the line within the circles and use the space for developing analogy from random words, another experience, a different academic field, etc.

Example



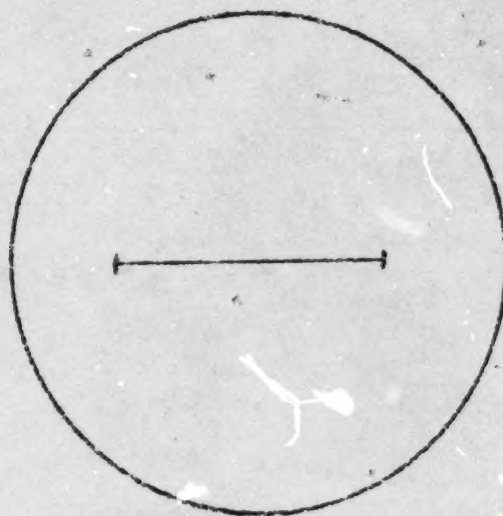
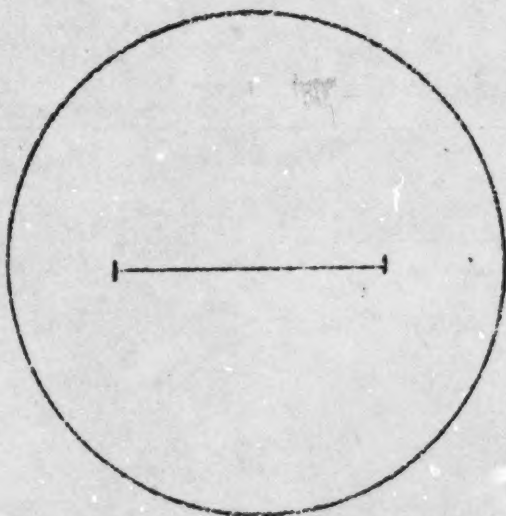
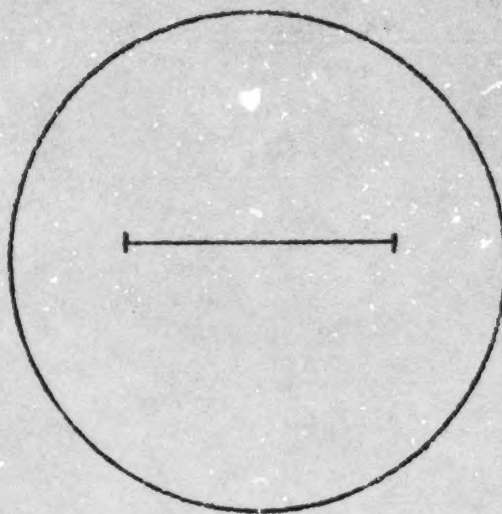
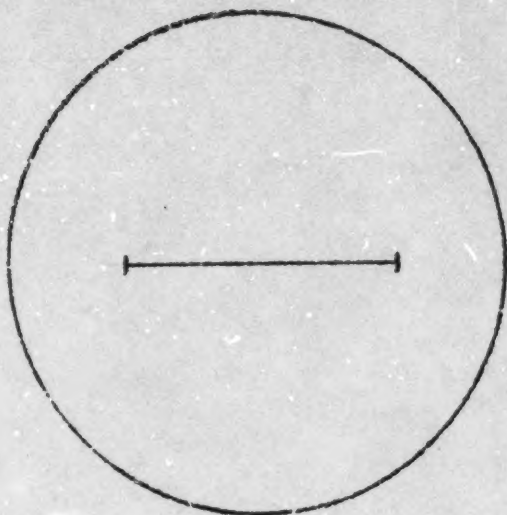


Figure 8

Worksheet 8

Educational Design Draft - Possible Futures

Using the ideation generated through Worksheet 7, develop drafts of "possible futures." Some possibilities will seem strange, but eliminate only the impossible from the ideation worksheet. Whatever remains, however improbable, might be possible and should be used for developing possible future scenarios. You should have several scenarios, because of combining different ideation possibilities. Number each scenario--use this sheet and attach additional pages.

Scenario One

The material developed for Worksheet Eight can be shared in small group sessions or further developed by small group sessions depending on how small the groups are. Groups can be formed randomly and given an opportunity to work for thirty minutes or so and then regrouped according to the topic question so that participants have an opportunity to discuss similar questions.

With the conclusion of Worksheet Eight, the process takes on the characteristics of a seminar with each participant taking responsibility to teach their question and be challenged by other participants as well as assisted by suggestions for resource material, sharing of experiential evidence, and the helpful questioning which asks the presenter to clarify ideas or substantiate evidence.

Worksheet Nine (See Fig. 9) launches the participants into the more traditional form of analysis and the evidence investigation phase of policy design. But the participants have already engaged in a personal analysis and ideation process about the problem, so that going into the literature, and perhaps into the field, only increases the awareness about the complexity of problems and the multi-faceted approaches that could be used in trying to solve them.

Figure 9

DESIGNING EDUCATIONAL FUTURES

Worksheet 9

Polarizing Designs -- what was; what is;
what could be; what ought to be

The influences of the past, the structures and conditions of the present, and the fear or hope of the future all have some bearing on the identification and solution of educational - social problems. Now is the time to dig into the literature and other resources to search for views on "what has caused the problem (etiology)?" "what behaviors are causal, structural or value induced (ethology)?" "what could ameliorate the problem?": what might be a better idea--analysis, interpretation, solution?"

This work needs to be carefully LOGGED. Use your LOG for accumulating resources. Also see the attached Name-Date Method guide for Bibliographic Style Sheet--the bibliographic references are important when the data is needed for final draft and proposal resource bibliography.

NAME-DATE METHOD

It is customary to indicate the sources used in writing a research or position paper. There are many style sheets and handbooks to turn to if you've any questions about footnotes, bibliographical references, direct and indirect quotes, etc. Any good library reference desk can usually furnish you with style sheets.

One easy approach you might consider is the "NAME-DATE METHOD". Using this method eliminates footnotes as all notations are in the running text. The following are the basics of this method:

1. For Indirect Quotes

- A. If you mention the name of the author in the running text, simply put the date of publication of source.

Ex: Brown (1936) has indicated . . .

- B. If the name is not mentioned in the running text, put both name and date in parenthesis.

Ex: Another expert (Brown, 1936) has disagreed . . .

2. For Direct Quotes, simply use whichever of the above is appropriate and follow the quote with the page number from which the direct quote was taken.

Ex 1: Brown (1936) has noted "The philosophical implication of . . ." (p. 328)

Ex 2: One author (Brown, 1936) has noted "The philosophical implication of . . ." (p.328)

Whenever there are two sources for an author with the same year, simply indicate this by using A and B.

Ex: (Brown, 1965 A)
(Brown, 1965 B)

The bibliography for this method is arranged alphabetically according to the author's last name. There's no need to separate books from articles.

Style Sheet for Bibliography:

Fuller, R. Buckminster. The Operating Manual for Spaceship Earth. New York, 1969. (Book)

Hammond, Kenneth R., and Leonard Adelman. "Science, Values, and Human Judgement," Science, Vol. 194, No. 4263 (22 October, 1976), 389-395. (Articles in Journals, Magazines, or Newspapers)

Swartz, Ronald. Interview, 25 October, 1976. (Oral conversations or taped interview.)

To avoid the participants becoming confused and perhaps depressed from the realization of "expert" disagreement, Worksheet Nine focuses the participants' attention on collecting as many different views, solutions and problem analyses as possible and actively looking for polarized designs. Rather than have the participants threatened by research studies which contradict one another and suggest that even specialists cannot agree, the participants are encouraged to search for difference and classify the differences as "polarized designs." This technique enables the participants to use several research methodologies in addition to the standard scholarship of investigating the literature. The methodologies associated with the social sciences are particularly useful¹¹ and give the participants an opportunity to do some field research even though they may not have complete mastery over a particular methodology. At this point, the participants are encouraged to seek out a specialist in a particular research methodology for additional assistance.

A major portion of the final policy design depends on the thoroughness, attention to detail, and perserverance and tenacity that the participants must apply to completing Worksheet Nine. The seminar sessions underline and reinforce the importance of the work needed to be undertaken and

give the participants the group feedback and interaction that is often essential for completing the task.

The seminar sessions can also deal with the tendency to over-extend the search for different views and the feeling that not enough stones have been turned. The polarized design concept is very helpful at this point as it allows the seminar participants the opportunity to understand the difference between a new design and a variation on an existing design.

When the participants and the seminar group judges that the objectives for Worksheet Nine have been met, they move into the final phase of policy design. Worksheet Ten (See Fig. 10) draws on the previous three worksheets and asks the participants to develop a variety of possible solutions, or answers, to their original problem question proposed for Worksheet Six. Here the emphasis is on a "problem/possibility focuser" rather than a single solution.¹² The participants are encouraged to think of the various ways a problem is viewed and the various ways suggested for its solution and try to incorporate those into possibilities for improvement, growth, development, experimentation, and/or further research, etc.

Figure 10

DESIGNING EDUCATIONAL FUTURES

Worksheet 10

Rough Draft -- Problem/Possibility Focuser

Utilizing worksheets 7, 8, and 9, it is time to develop a draft of the final design in the form of a "problem/possibility" focuser. The idea is to identify the problem or issue and then develop a variety of possible solutions--i.e. the idea that problems are not roadblocks, but offer possibilities for creative innovation.

Use this sheet and attach additional pages, or use your LOG.

At this point, the participants become the designers in formulating policy recommendations and attempt to anticipate the various value differences associated with policy designs. The value differentiation is used to construct policy designs which view difference as healthy and constructive, and which in turn strengthens competition for quality, and enhances professional development.

The finished product of Designing Educational Futures is an ABSTRACT (See Fig. 11) which can serve as a position paper for those individuals in leadership roles who would have jurisdiction over the area or areas of responsibility covered in the policy design. Rather than write out a complete proposal, the ABSTRACT is developed. If further consideration of the policy design is asked for then the participant has all the necessary research and bibliography to write a full proposal. The idea of the ABSTRACT is to move the policy design into the policy formulation stage as quickly as possible by insuring that key individuals are made aware of the potentials for problem solving through the ABSTRACT.

Figure 11

Worksheet 11

An Educational Policy Design ABSTRACT

Your final task is to complete the "Educational Policy Design Abstract" by utilizing Worksheet 10 and writing a DESIGN ABSTRACT to the person or persons, committee, Board, etc., that would be in a position to consider and implement your educational design.

The DESIGN ABSTRACT should be no longer than two or three typed pages in which you identify the problem and propose a variety of possible policy strategies, or alternatives to viewing the causes of the problem and alternative ways of attempting to find a solution. The Name-Date Method should be used in the ABSTRACT rather than footnotes and a Resource Bibliography should be attached. The Bibliography should contain the essential references that would be needed should your ABSTRACT be developed into a full-bodied proposal.

The Resource Bibliography should be compiled using any standard Bibliographic style sheet, or the Name-Date style sheet. (See Worksheet 9.)

A strategy that is often effective is to send the ABSTRACT along with a letter or memorandum that asks for a response, further suggestions, or names of people who might be interested in pursuing the policy ideas further. This keeps the option of policy formulation open for the designer and lessens the threatening effect the ABSTRACT might have on individuals who are supposed to be dealing with such matters but are not.

Summary

The role of the teacher as an educational design scientist opens new vistas for the teacher, students, the educational process, and increases the benefits to the community and society. The teacher can continue to carry out the specialist function of teaching a grade level or an academic or vocational subject, but in addition the role of educational design scientist gives the teacher an opportunity to learn and develop new skills around policy analysis and formulation, as well as integrating their own subject matter specialty into problem solving. Students would benefit from acquiring problem solving skills and the mastery of various basic academic skills interwoven with the problem solving skills necessary to design futures.

The educational process with the aim of increasing human knowledge and devoted to comprehension, competence, creativity, and consideration¹³ would benefit by having students and teachers involved in designing futures. Finally, the community would benefit by having additional human resources working on various problems that affected the interaction and development of the community.

Designing educational futures and developing the role of the teacher as an anticipatory design scientist might, hopefully, contribute

more completely to man's need for comprehension, competence, creativity and especially consideration.

For in the process of consideration lies mankind's hope for making decisions and selecting policies that will guide the human community into a better tomorrow rather than oblivion. The challenge is to find humane ways to move society from its present "tragedy of the commons"¹⁴ paradigm to a new model that might be called the triumph of community. Any and all attempts to engage the formal and informal educational systems in this work of transformation can but only insure untold dividends for mankind if its succeeds.¹⁵

FOOTNOTES

1. School of Education, Oakland University, A Report to the National Council for Accreditation of Teacher Education, Vol. 1, Rochester, Michigan, 1976, 143-144.
2. R. Swartz, "Toward a Liberal View of Educational Authorities," Teachers College Record, Vol. 78, No. 4 (May, 1977), 414-436.
3. The work of E. F. Esfundary in Up-Wingers, Fawcett-Popular Library, Conn., 1978, develops the idea of telecommunications as taking the place of educational buildings — schools and colleges as physical places will be replaced, he envisions, with video cassettes and CRT terminals. Also the experiments going on in Great Britain with phone — T.V. hookups would indicate the possible direction of an extended educational telecommunications system.
4. R. B. Fuller, Operating Manual for Spaceship Earth, Southern Illinois University Press, Carbondale, Ill., 1969, 10 and Utopia or Oblivion, Bantam Books, N.Y., 1969, 293-94, 328-29.
5. R. B. Fuller, Nine Chains to the Moon, J. B. Lippincott, N.Y., 1938, 64, and Utopia or Oblivion, op. cit., 327. The prime factors of wealth are energy and knowledge. Energy can be expressed as $E=mc^2$. Knowledge can be expressed as population. Therefore, per capita wealth = mc^2 . Also since energy cannot be created or destroyed (Law of Conservation of Energy) and knowledge can only increase then education faces a challenge to contribute to knowledge and assist the enormous potential of human population to acquire more knowledge and directly increases wealth. Fuller predicted in 1938 that dollars as symbols of wealth would eventually become equated to energy units as thus salary could be accounted for in kilowatts rather than gold stored in vaults. We seem to be coming closer to that possibility.
6. Associative axiology in the sense that the participant chooses a color to represent a period of time and expresses his feelings about a color with his value perception of a given time period. For studies on color choices and emotional maturity see The Lüscher Color Test, translated and ed. I. A. Scott, Random House, N.Y., 1969.
7. N. Postman, "Telling It Like It Ain't," CBC Learning Systems, Toronto, Canada, Cassette tape #574.
8. Postman suggests that some problem situations might be the answer. For example, children roaming in the halls of a school disturbing teachers and students in classrooms might be identified as a problem the answer to the problem is the problem if the halls are recognized as areas where learning can take place and

where students have an opportunity to talk with teachers on an informal basis. In a school that initiated the "open hall policy" the problem of noisy halls disappeared when the school officials recognized the halls as places where students could carry on legitimate learning activities on an informal basis with teachers assigned to certain corridors.

9. The ideal small group size is four, but combinations of small groups or multiples of four up to 32 can usually be arranged in classrooms, meeting rooms or conference centers. Groups larger than 32 should be worked with in module groups no larger than 32.
10. E. DeBono, "How To Change Ideas," J. Norton Pub. Co., N.Y., 1973, Cassette tape #33029.
11. Ethnography (participant-observation); oral history; sociological and psychological survey and sampling techniques.
12. R. Theobald, Beyond Despair, New Republic Book Co., Washington, D.C., 1976, 126-127.
13. A tetrahedral model to visualize a system of basic educational concepts would have consideration at the apex and the three base vertexes labeled competence, comprehension and creativity. I use this model for explaining a systems approach to education (Clatworthy's four C's).
14. See G. Hardin and J. Baden, Managing the Commons, W. H. Freeman Co., San Francisco, 1977, pp. 16-30 and 261-79.
15. See W. Harmon, An Incomplete Guide to the Future, San Francisco Book Company, 1976, pp. 144-45. The study of this transformation necessary to move a post-industrial society from the tragedy of the commons to the triumph of community should be called human synecology and engage the full effort of anticipatory design scientists from as many diverse academic fields as possible — i.e., education, systems engineering, chemistry, history, economics, etc.